



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>5</sup> :</b> <b>H04B 1/06, H05K 11/00</b> <b>H04B 1/08</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 90/08431</b>  <b>(43) International Publication Date:</b> 26 July 1990 (26.07.90)
<b>(21) International Application Number:</b> PCT/US90/00162 <b>(22) International Filing Date:</b> 16 January 1990 (16.01.90)  <b>(30) Priority data:</b> 299,300                      23 January 1989 (23.01.89)      US  <b>(71) Applicant:</b> MOTOROLA, INC. [US/US]; 1303 East Algonquin Road, Schaumburg, IL 60196 (US). <b>(72) Inventors:</b> KURCBART, Robert ; 21311 Escondido Way, Boca Raton, FL 33433 (US). DULANEY, Randy, Lisa ; 11770 Island Lakes Lane, Boca Raton, FL 33498 (US). <b>(74) Agents:</b> PARMELEE, Steven, G. et al.; Motorola, Inc., Intellectual Property Dept., 1303 East Algonquin Road, Schaumburg, IL 60196 (US).		<b>(81) Designated States:</b> AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> MULTI-ATTACHMENT PORTABLE RADIO  <div style="text-align: center;"> </div>		
<b>(57) Abstract</b>  <p>In order to allow a pager (1) to be worn in a variety of positions on different parts of the clothing of a user, there is provided a plurality of different attachment devices such as tie or belt clips, pendants, wrist straps, brooch clips, fobs or belt buckles. Each attachment device has mounted thereon means (12) for coupling it to a complementary coupling means (8) on the pager. The pager coupling means (8) is a recess for receiving an element (12) and also includes electrical contacts (10) for coupling the pager to desk-top accessories such as facsimile machines, modems, printer units, recording machines, computer interface units, battery recharging units, or auxiliary display devices.</p>		

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**MULTI-ATTACHMENTED PORTABLE RADIO**

This invention relates generally to portable radios and more particularly to portable radios of the type which receive messages, such as those commonly known as pagers.

As technology has advanced, so the size of portable radios has decreased to the point where they are commonly of such a size that can easily fit into a pocket or a purse. It is known in the prior art for such pocket-sized portable radios to be provided with a clip so that they may be clipped to, for example, a pocket or a belt. It is also well known that other types of portable articles such as compact cameras or portable tape players are provided with different types of carrying means such as wrist straps, but in none of these cases does the person carrying the article have the opportunity to choose for themselves the mode of carrying or wearing the article.

It is thus an object of the present invention to provide means whereby the end user of a portable radio can choose how to carry or wear the radio.

Therefore, according to one aspect of the invention, there is provided a portable radio system comprising a portable radio having a housing including coupling means and a plurality of different, interchangeable attachment devices having coupling means which are complementary to the housing coupling means for coupling any one of the attachment devices to the radio housing, wherein the attachment devices are configured for attachment to an end user.

The portable radio is preferably a pager and the attachment devices may be configured for attachment to different parts of an end user which may be an accessory device, such as an auxiliary display unit, a recording machine, a battery recharging unit, a modem, a facsimile

machine, a computer interface unit or a printer unit, or maybe a person. In the case of the end user being a person, the attachment devices are preferably configured for attachment to the person's clothing or body and may  
5 differ by being of different colors or for attachment to different parts of the person's clothing or body. For example, the attachment devices may include tie or belt clips, pendants, wrist straps, brooch clips, fobs or even belt buckles.

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The housing and attachment device coupling means preferably comprise a recess having indents therein and a complementary protuberance having detents thereon which fit into said indents in the recess when coupled together. In  
15 a preferred embodiment, the detents are spring-loaded and the coupling means include means for retracting the detents into the protuberance when it is to be inserted into the recess.

20

The housing and attachment device coupling means preferably also include complementary electrical coupling means for electrically coupling the portable radio to the accessory device. There may also be provided a filler  
25 element for blanking off the radio housing coupling means when not coupled to an attachment device. Preferably, the system also includes at least one accessory module, such as a calculator module, a timing module or an auxiliary display module, having complementary coupling means thereon for coupling between the radio housing and the attachment  
30 device.

According to other aspects of the invention, there are provided methods of mounting a portable radio on an end user and of carrying a portable radio, comprising the steps  
35 of selecting one of a plurality of different, interchangeable attachment devices, coupling the selected attachment device to the portable radio via coupling means thereon; and attaching the portable radio, via the

attachment device coupled thereto, onto the end user or onto an appropriate part of a person's clothing or body.

The invention will now be more fully described, by way of example only, with reference to the drawings of which:

FIG. 1 shows three views of a pager for use in the system according to the invention;

FIG. 2 shows in greater detail part of the pager of FIG. 1;

FIGS. 3-9 show different types of attachment devices for use with the present invention;

FIG. 10 shows in greater detail part of the attachment devices of FIGS. 3-9;

FIGS. 11-14 show different types of accessory devices for use with the invention;

FIG. 15 shows an accessory module for use with the invention; and

FIG. 16 shows a blanking element for use with the invention.

Thus, there is shown in FIG. 1 a portable radio (1) of the type known as a pager which receives RF messages from a transmitter, decodes them and displays them on a display (2) to be read by the user of the pager. Conventionally, such pagers have loudspeakers (3) which provide an audible indication to the user that a message has been received, and may also have various controls (4) to cancel the display or otherwise control its size, brightness, etc. or the volume of the audible indication.

The pager is formed from a housing in two halves: a front half (5) having the display (2) and controls (4) thereon, and a rear half (6) as shown in the figure. The rear half 6 has an opening to a battery housing which is closed by a battery housing cover (7).

The rear half (6) of the housing also includes, in accordance with the invention, a coupling means (8) comprising a recess (9) in the pager (1) for coupling the pager to an attachment device. This coupling means (8) is more clearly shown in FIG. 2. The recess (9) is a parallelepiped having a plurality of electrical contacts (10) upstanding from the base thereof, and an indent (11) in the two ends of the recess (9). The recess (9) may, of course, be of other configurations but must be so shaped as to be able to receive a complementary coupling means situated on an accessory. Such a complementary coupling means comprises, as shown in FIG. 10, an element (12) which is mounted on an accessory (13) to be coupled to the pager (1). The element (12) comprises a parallelepiped of such a size and shape as to fit into the recess (9) in the pager (1), and has two spring-loaded detents (14, 15) on the ends thereof which lock into the indents (11) of the recess (9) in order to retain the element in the recess. The detents (14, 15) are spring-loaded so as to be biased outwards in order to retain the element in the recess but may, if the configuration of the accessory allows, be retractable by a pair of thumb-operated retractors (16, 17) which are slidably movable against the force of the springs to retract the detents (14, 15) into the element for ease of insertion into the recess (9).

As described above, the size of modern day pagers is such that they are frequently worn in a shirt pocket or on a belt, but it has never previously been possible for the user to choose from a wide range of possible wearing modes. FIGS. 3-9 show a selection of possible attachment devices, all having mounted thereon a coupling means of the type

described above and as shown in FIG. 10. It will be appreciated that other configurations are possible and that these particular devices are shown by way of example only.

5           Thus, FIG. 3 shows a belt clip (18) having the element (12) mounted thereon. The belt clip comprises an attachment arm (19) for clipping to the belt, pivotably coupled to the element (12) so as to allow the pager to have some freedom of movement when attached to the belt.

10

          In FIG. 4, the element (12) is mounted on a base plate (20) which carries a safety pin (21) for pinning the pager to clothing in the form of a brooch. FIG. 5 shows the element (12) mounted on a T-shaped base plate (22). The  
15       transverse arm of the base plate (22) carries a spring biased clip (23) parallel to the element (12) for clipping the pager to a tie worn by a user. In FIG. 6, the element (12) is mounted on a base (24) carrying an eyelet (25) through which is threaded a chain (26) to enable the pager  
20       to be carried around the neck in the form of a pendant.

          FIG. 7 shows an accessory device in the form of a wrist strap comprising a mounting plate (27) having a strap (28) attached to two sides thereof for wearing around a  
25       user's wrist. The plate (27) carries the element (12) on its central portion and has a protective edge (21) around the perimeter thereof of such a size as to allow the pager to fit within it. It will, of course, be apparent that such a configuration will not allow the retractors (16, 17)  
30       to be provided as the pager would have to be fitted directly onto the element. This figure also shows a recess (30) provided in the element (12) necessary to allow the element to fit around the electrical contacts (10) provided in the recess (9) for connection with other types of  
35       accessories to be described below.

          In FIG. 8, there is shown a fob comprising a clip (31) connected via a short length of chain (32) to the element

(12). Such a fob may be used by attaching the clip to a belt or pocket edge for security purposes but allows the pager to be carried in the pocket, for example.

5        FIG. 9 shows a belt buckle allowing the pager to be carried at the front of the belt in place of a normal buckle. The buckle comprises a main housing (33) having a recess (34) in the center thereof for receiving the pager. The bottom of the recess (34) carries the element (12)  
10 similarly to the wrist strap of FIG. 7. The outside front portions of the housing (33) may, of course, be decorated in any desired fashion. The underside of the housing (33) carries at one end thereof an arched element (35) forming a slot between it and the housing through which slot the belt  
15 is threaded. The other end of the housing carries an L-shaped spigot (36) which is inserted through a hole in the belt in order to fasten the belt securely.

      If the user of the pager is sitting at a desk, there  
20 is no need for the user to actually be wearing the pager. It could be simply placed on the user's desk or it could be connected on an accessory device. Such an accessory device may be a device for connecting the pager to a computer either directly by means of an interface unit or via  
25 telephone lines by means of a modem. Such a device is shown schematically in FIG. 11 wherein the device includes a recess (37) having the element (12) therein for coupling to the pager. In this case, the element (12) carries electrical contacts (38) for coupling with the electrical  
30 contacts (20) mounted on the base of the recess (9) of the pager. By means of these contracts, the pager can be electrically connected to the modem or computer interface unit for communication therewith. Such communication is controlled by the user using the controls (39) mounted on  
35 the device. The pager may alternatively be coupled to a printer unit or a facsimile machine in order to print out or fax any messages stored therein. Such an accessory device is shown in FIG. 12 and comprises a recess (40)



having the element (12) with electrical contacts (38) thereon, a printing mechanism (41) including paper (42), and controls (43) for controlling the device. Messages stored in the pager may alternatively be recorded onto tape using a recording machine as shown in FIG. 14. Such a machine includes a recess (44) having the element (12) with electrical contacts (38) and a conventional recording mechanism (45) which receives a tape cassette and includes controls (46). An alternate desk-top accessory device is shown in FIG. 12. This is an auxiliary display device and includes a recess (47) having the element (12) with electrical contacts (38) for connection to the pager, and a display screen (48) with controls (49) associated therewith to enable messages to be displayed on a larger screen which is more easily viewed at a desk. A further accessory device which may be provided is a battery recharging unit for recharging the pager batteries whilst the user is sitting at a desk, and this unit may be incorporated into any of the above described desk-top accessories, although it may, of course, also be provided as a separate unit.

If the user desires to simply keep the pager in a pocket, there is also provided a blanking element (54), shown in FIG. 16, which includes retractors (55, 56) for detents (57, 58) which are similar to those on the coupling devices described with reference to FIG. 10. However, in this case, the element (54) is not mounted on anything and is used merely to blank off the recess of the pager and to protect the electrical contacts (10) therein.

In a further development of the present invention, there may also be provided a set of accessory modules for adding to the pager and mounting between the pager and the attachment device or desk-top accessory device. Such accessory modules may include calculator modules, watch or timing modules or auxiliary display modules, or a combination of any of these.

FIG. 15 shows such a combined calculator, watch, and display module. It comprises a housing (50) having a recess (51) in a front face thereof and extending through one end of the housing. The recess has the element (12) with electrical contacts (38) for coupling to the pager in the manner described above. The front face of the module also includes a display means (52) and control keys (53) thereon. The control keys are used to enter calculations when using the calculator function of the module, or to adjust the timing function of the module which is displayed on the display means (52). The module can also be used simply as an auxiliary display device to expand the display capacity of the pager. Since this module is designed to be portable along with the pager, it is provided on its back face with a coupling means such as that described above with reference to FIG. 2 in order to allow it to be coupled to any of the attachment or accessory devices described above.

Thus, there has been described a system which dramatically expands the possible modes of wearing and operating a pager. Such a system allows the user to have the option of various styles of pagers without the need for new receivers, decoders, antenna or mechanics to be produced for each version by the manufacturer. The system allows the pager to be adapted to the clothing and fashion of the user. It will be appreciated, of course, that the attachment devices may be produced in a variety of colors to match the colors of the clothing worn by the user. It will further be appreciated that although specific attachment devices, accessory devices, and accessory modules have been described and illustrated, the invention is not limited to these particular embodiments but is intended to incorporate other embodiments which are within the scope of the claims.

What is claimed is:

Claims

1. A portable radio system comprising a portable radio having a housing including coupling means, and a plurality of different, interchangeable attachment devices having coupling means which are complementary to the housing coupling means for coupling any one of the attachment devices to the radio housing, wherein the attachment devices are configured for attachment to an end user.
2. A portable radio system according to claim 1 wherein at least some of the plurality of different, interchangeable attachment devices are configured for attachment to a different part of said end user.
3. A portable radio system according to claim 1 wherein said end user is a person and each of said attachment devices is configured for attachment to a particular part of the person's clothing or body.
4. A portable radio system according to claim 3 wherein each of said attachment devices is configured for attachment to a different part of the person's clothing or body.
5. A portable radio system according to claim 3 wherein at least one of said plurality of attachment devices comprises a tie clip.
6. A portable radio system according to claim 3 wherein at least one of said plurality of attachment devices comprises a belt clip.
7. A portable radio system according to claim 3 wherein at least one of said plurality of attachment devices comprises a pendant.

8. A portable radio system according to claim 3 wherein at least one of said plurality of attachment devices comprises a wrist strap.
- 5 9. A portable radio system according to claim 3 wherein at least one of said plurality of attachment devices comprises a brooch clip.
- 10 10. A portable radio system according to claim 3 wherein at least one of said plurality of attachment devices comprises a belt buckle.
- 15 11. A portable radio system according to claim 3 wherein at least one of said plurality of attachment devices comprises a fob.
12. A portable radio system according to claim 1 wherein said end user is an accessory device.
- 20 13. A portable radio system according to claim 12 wherein said attachment device is integral with said accessory device.
- 25 14. A portable radio system according to claim 12 wherein said accessory device is a recording machine.
15. A portable radio system according to claim 12 wherein said accessory device is a battery recharging unit.
- 30 16. A portable radio system according to claim 12 wherein said accessory device is a computer interface unit.
17. A portable radio system according to claim 12 wherein said accessory device is a facsimile machine.
- 35 18. A portable radio system according to claim 12 wherein said accessory device is a printer unit.

19. A portable radio system according to claim 12 wherein said accessory device is a modem.
20. A portable radio system according to claim 1 wherein  
5 said housing and attachment device coupling means comprise a recess having indents therein and a complementary protuberance having detents thereon which fit into said indents in said recess when coupled together.
- 10 21. A portable radio system according to claim 20 wherein said detents are spring-loaded and the coupling means includes means for retracting the detents into the protuberance when it is to be inserted into the recess.
- 15 22. A portable radio system according to claim 12 wherein said housing and attachment device coupling means include complementary electrical coupling means for electrically coupling the portable radio to said accessory device.
- 20 23. A portable radio system according to claim 1 further including at least one accessory module having complementary coupling means thereon for coupling between said radio housing and said attachment device.
- 25 24. A portable radio system according to claim 23 wherein said accessory module comprises a calculator module.
25. A portable radio system according to claim 23 wherein said accessory module comprises a timing module.
- 30 26. A portable radio system according to claim 23 wherein said accessory module comprises an auxiliary display module.
- 35 27. A portable radio system according to claim 23 wherein said accessory module comprises an auxiliary power pack.
-

28. A portable radio system according to claim 1 further comprising a blanking element for blanking off said radio housing coupling means when not coupled to an attachment device.

5

29. A portable radio system according to claim 1 wherein said portable radio is a paging device.

30. A method of mounting a portable radio on an end user comprising the steps of:
- selecting one of a plurality of different, interchangeable attachment devices;
  - 5       coupling the selected attachment device to the portable radio via coupling means thereon; and
  - attaching said portable radio, via the attachment device coupled thereto, onto said end user.
- 10 31. The method of claim 30 wherein said end user is a person and the step of mounting said portable radio involves mounting it on an appropriate part of the person's clothing or body.
- 15 32. The method of claim 30 wherein said end user comprises an accessory device and the step of mounting said portable radio includes electrically coupling the radio to the accessory device.
-

33. A method of carrying a portable radio comprising the steps of:

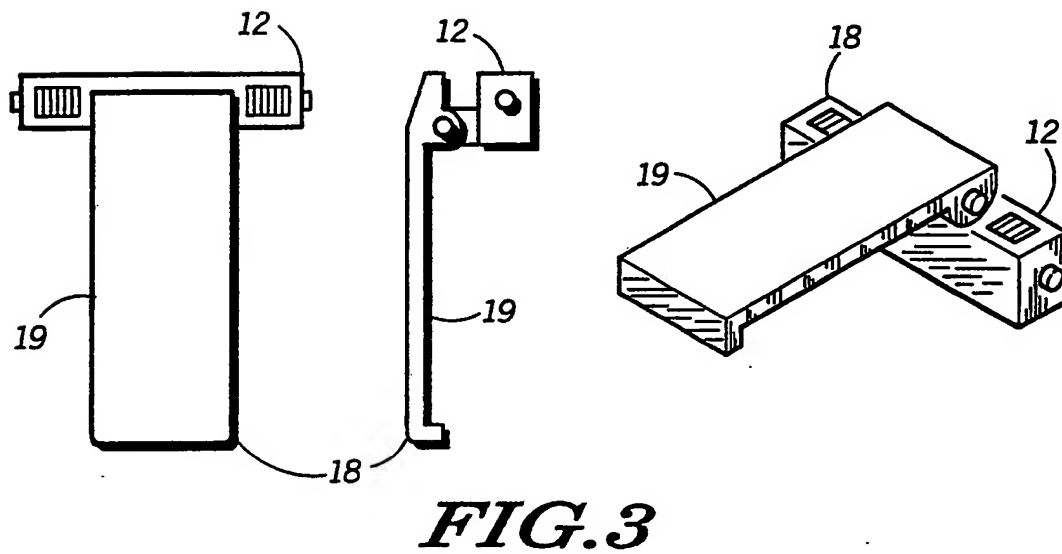
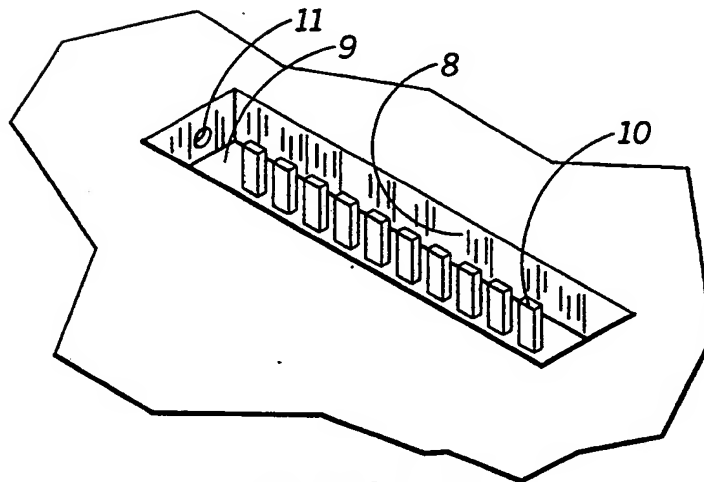
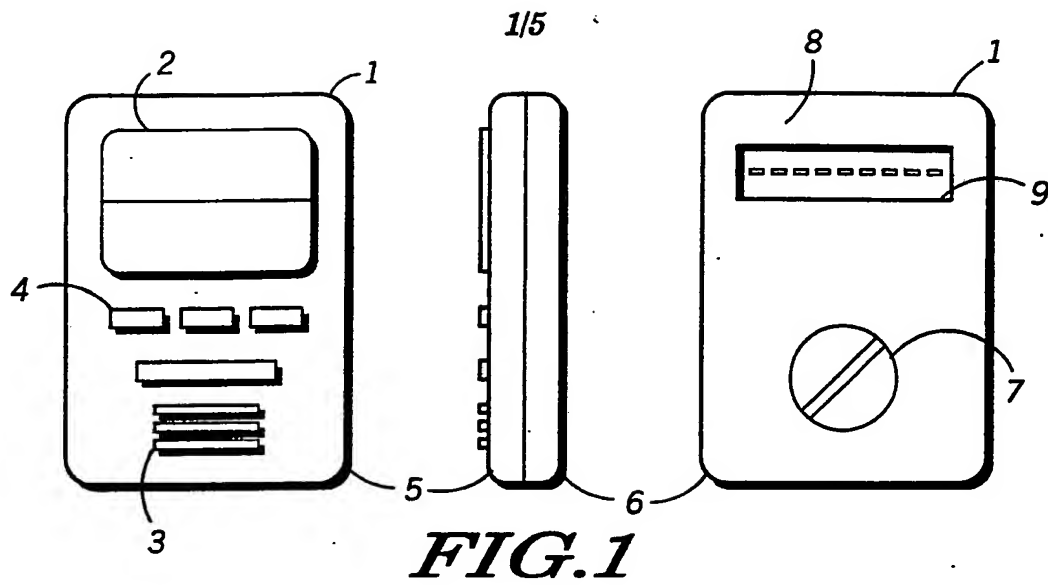
selecting one of a plurality of different,  
interchangeable attachment devices;

5 coupling the selected attachment device to the  
portable radio via coupling means thereon; and

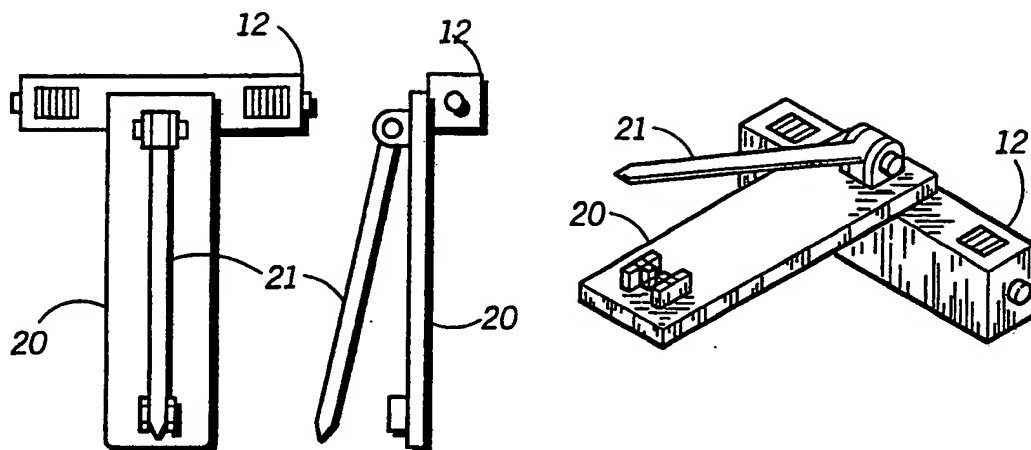
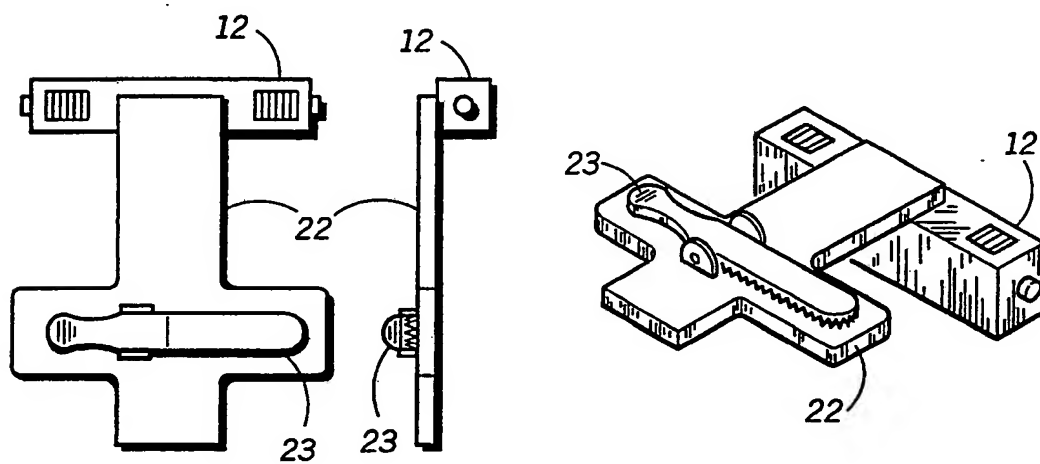
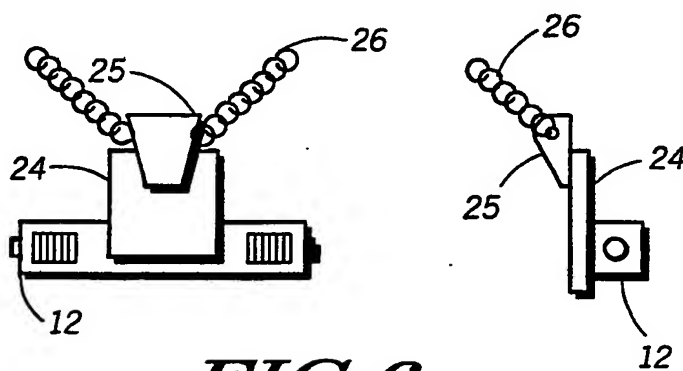
attaching said portable radio, via said attachment  
device coupled thereto, onto an appropriate part of a  
person's body or clothing.



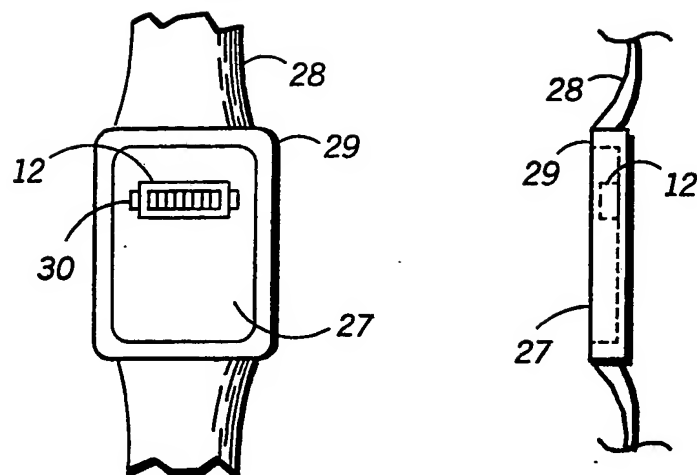
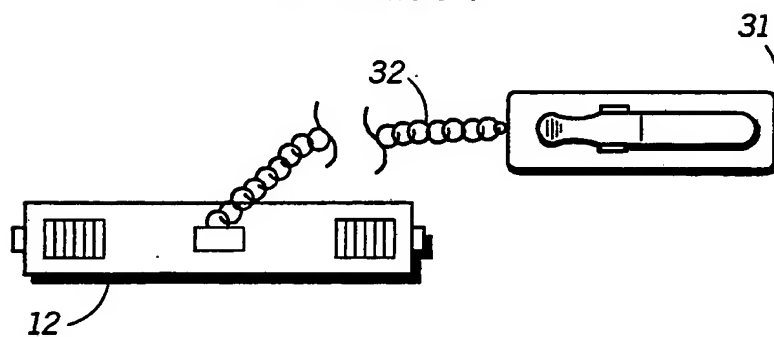
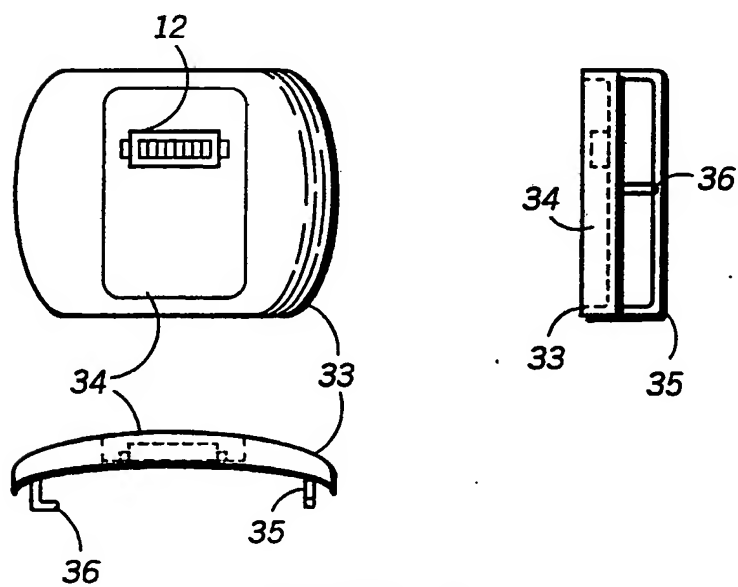
34. A method of personally customizing a portable radio to one of a plurality of wearing modes, comprising the steps of:
- providing a plurality of different, interchangeable attachment devices, each of which is configured for attachment for a part of an end user's clothing or body;
  - selecting an appropriate one of said attachment devices according to the wearing mode desired; and
  - coupling the selected attachment device to said portable radio via coupling means thereon.
35. The method of claim 34 where said attachment devices differ from each other according to their color.
36. The method of claim 34 wherein said attachment devices differ from each other according to their configuration.



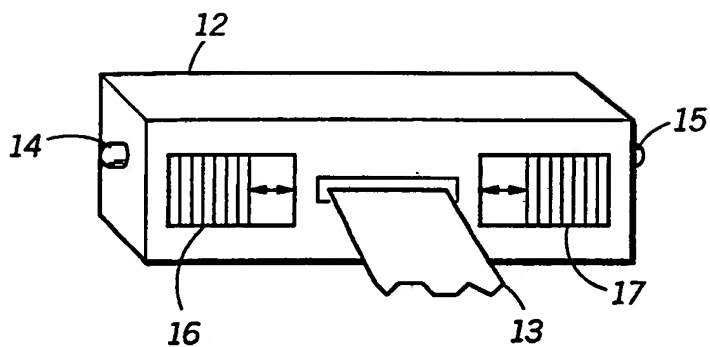
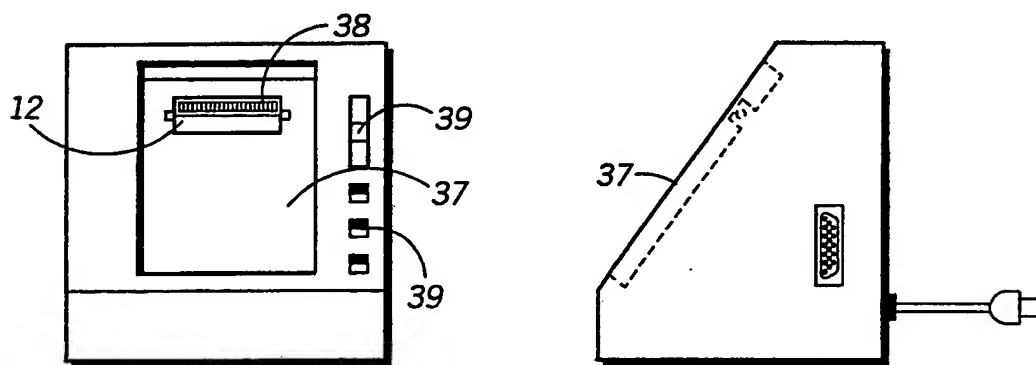
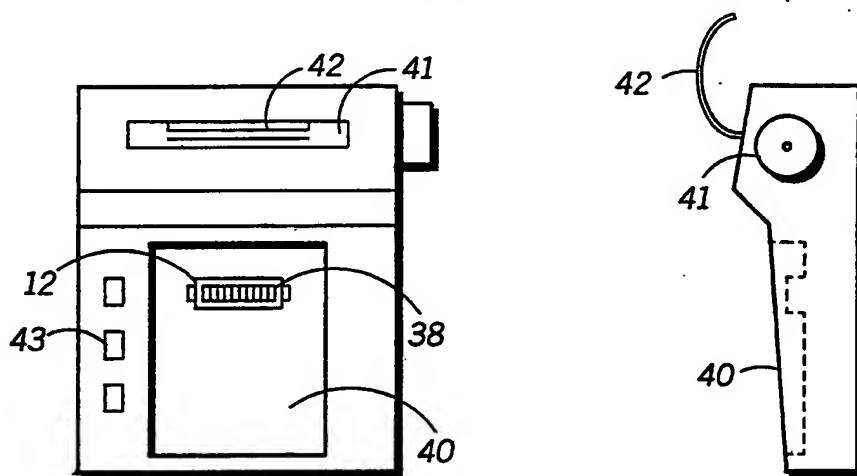
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**FIG. 4****FIG. 5****FIG. 6**

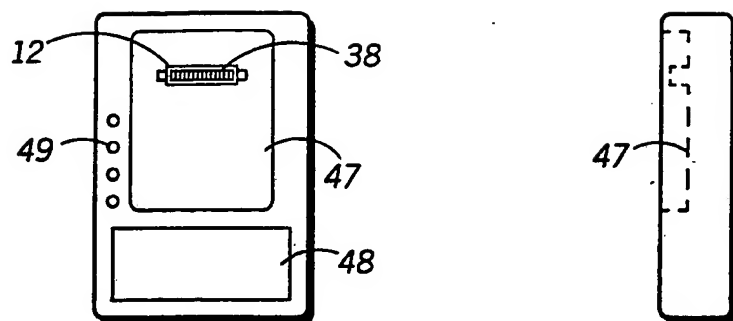
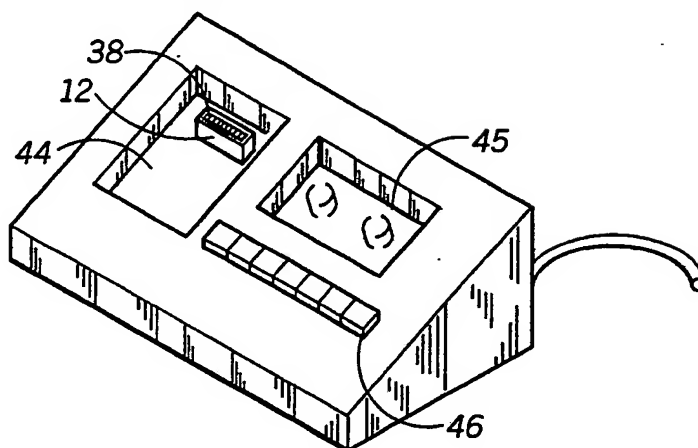
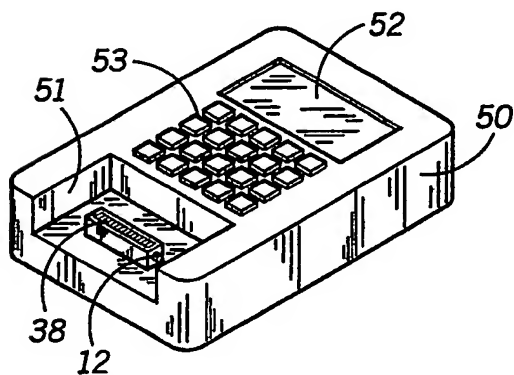
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**FIG. 7****FIG. 8****FIG. 9**

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**FIG. 10****FIG. 11****FIG. 12**

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**FIG. 13****FIG. 14****FIG. 15****FIG. 16**

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/US90/00162

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC <sup>5</sup> H04B 1/06; H05K 11/00; H04B 1/08		
US 455/347		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
US	455/347, 348, 349, 350, 344, 66 200/Dig2	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>9</sup>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X Y	US, A, 4,641,370 (Oyamada) 03 February 1987 See the entire document	1-4, 6-7, 12 13, 20-22, 29-34, 36 8-11.35
Y	US, A, 4,419,770 (Yagi et al.) 06 December 1983	8-11, 35
A	US, A, 3,851,123 (Lipinski et al.) 26 November 1974	
A	US, A, 3,631,994 (Mackzum, Jr.) 04 January 1972	
A, P	US, A, 4,845,485 (Pace) 04 July 1989	
A	US, A, 4,534,063 (Krumin et al.) 06 August 1985	
A	US, A, 4,010,340 (Palmaer) 01 March 1977	
A	US, A, 4,074,082 (Sato et al.) 14 February 1978	
A	US, A, 4,688,262 (Schaefer et al.) 18 August 1987	
A	IBM Technical Disclosure Bulletin, vol. 15, No 11 (pp 3350-3351) April 1973	
<p><sup>10</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
14 FEBRUARY 1990		18 APR 1990
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		<i>Nguyen</i> NGUYEN